

REMARKS

Applicants respectfully solicit reconsideration and a Notice of Allowance.

Applicants present Claims 1-7 and 9-25. Claim 8 is canceled.

Applicants request that Claims 2, 11-13 and 15-21 be re-joined with Claims 1, 3-7, 10, 14 and 22-25.

Applicants acknowledge the Examiner's careful consideration of this Application.

Applicants appreciate the favorable reconsideration of certain rejections. *See*, Office Action, page 2, paragraph 1.

Before turning to the various prior art rejections of record, Applicants respectfully point out their present claimed inventions offer advantages over the art. The unique effects of the present invention are disclosed in Applicants' specification. Production Example 4 (pages 57-58) relates to Example 8 (page 60). Polyaniline is reported as a dispersing agent. However, when it is in a doped condition, it is not solved in a solvent. Therefore, this is an undoped condition by the ammonia treatment, and thereby this is dissolved in a solvent, and has dispersing effects on carbon nanotube, as explained in the production Example 4. However, since polyaniline in the undoped condition acts as electric insulation, contact resistance between carbon nanotubes increases, and the obtained coated film cannot exert sufficient conductivity. Therefore, as reported at page 66, after forming the coated film, the coated film was further subjected to the acidic treatment to convert the polyaniline in from undoped conditions to doped conditions, and thereby conductivity of the coated film was obtained in example 8 (the composition 8 containing carbon nanotube). More particularly, Applicants disclose the composition was coated onto a glass plate according to the bar coater method (using a No. 5 bar coater) and dried for 5 minutes at 150°C to form a coated film followed by immersing for 5

minutes in a 1 mol/liter aqueous solution of sulfuric acid. In another words, in order to exert conductivity of the coated film containing a conducting polymer in undoped conditions in Example 8, after the coated film is formed an acidic treatment is additionally necessary. That is, when using a conducting polymer in undoped conditions, two steps of coating and treating with an acid are necessary. This operation is complicated.

Contrariwise, the acidic group in the water soluble conducting polymer having an acidic group is hydrophilic, and the polymer is dissolved in a solvent. In addition, since the polymer used in the present invention is a self-doped conductive polymer which functions as a dopant, it is possible to exert sufficient conductivity of the coated film by only one process of coating the composition without requiring the additional acid treatment step(s), while also ensuring the dispersing effects on the carbon nanotube. Therefore, the present invention has superior conductivity and has simple processes.

1. Claims 1 and 8 are novel over Chen et al.

Claims 1 and 8 are not anticipated.

Chen (US 2004/0266939) does not disclose the water soluble conducting polymer having an acidic group(s) as in claim 1. Since the conductive polymer in Chen is not a water soluble conducting polymer having an acidic group, the conducting polymer is in an undoped condition. In contrast, the conducting polymer used in the present invention is in a doped condition. Specifically, “doped condition” means conditions in which a proton such as an organic acid is added to the structure. A conducting polymer in doped conditions is divided into a conducting polymer in outside-doped condition, after which it is necessary to be treated with an outside dopant such as hydrochloric acid and sulfuric acid, and a conducting polymer in a self-doped condition in which an

acidic group, such as a sulfuric acid group, is introduced covalently into the structure of the conducting polymer, similar to the present invention. "Undoped condition" means conditions in which the outside-dopant such as a proton is not added, in addition to conditions in which the acidic group is not free, that is the acidic group is not a proton, a sulfonic acid forms a salt in the case of the self-dopant conditions. All the conducting polymers in Chen are in undoped conditions. In contrast, since the conducting polymer used in the present invention has an acidic group, the conducting polymer has a self-dopant, and this is a doped condition.

Therefore, in the present invention, it is possible to show conductivity without a treatment using the outside-dopant.

2. Claims 1, 3, 5, 8 and 22-25 are novel over Blanchet-Fincher et al.

Blanchet-Fincher (US 2004/0021131) discloses polyaniline, polythiophene, and polypyrrole. These are outside-doped conducting polymer to which an organic acid such as dinonylnaphthalene sulfonic acid (DNNSA, [0073]), dodecylbenzene sulfonic acid (DBSA, [0060]) are added covalently.

In contrast, the conducting polymer used in the present invention has an acidic group, and this has a self-dopant in a doped condition. Therefore, it is possible to exert conductivity without a treatment using the outside-dopant.

3. Claims 1, 5 and 22-25 are novel over Glatkowski et al.

Amended claim 1 includes language drawn from former claim 8, and the latter was not rejected over the Glatkowski (US 2003/012111) reference, whereby claim 1 and its dependent claims are patentable over the Glatkowski reference.

Independent of any claim amendments, the Office Action recognizes that that another seminal point is that the Glatkowski reference “does not require the component(s) with sufficient specificity to constitute anticipation,” which additionally supports novelty.

As an example of the polymer, a polyimide at Page 3, [0048], is mentioned in the Glatkowski reference. However, there is no mention about the kinds, the structure, and the doped conditions (the kinds of the dopant) of the conducting polymer, in addition to a lack of description about dispersing effects on CNT due to the conducting polymer.

In contrast, the conducting polymer used in the present invention has an acidic group, and this has a self-dopant in doped conditions. Therefore, it is possible to show conductivity without a treatment using the outside-dopant.

Glatkowski does not disclose these features nor would it have indicated or suggested them to a person of ordinary skill in the art.

4. Claims 1 and 22-25 are unobvious over Eikos et al.

Amended claim 1 includes language drawn from former claim 8, and the latter was not rejected over the Eikos (WO 03/013199) reference, whereby claim 1 and its dependent claims are patentable over the the Eikos reference.

Independent of any claim amendments, the Office Action recognizes that that another seminal point is that the Eikos reference “does not require the component(s) with sufficient specificity to constitute anticipation,” which furthermore supports unobviousness as well.

Although Eikos might *arguendo* disclose a conducting polymer as an example of a polymer, there is no mention about the kinds, the structure, and the doped condition (the kinds of

the dopant) of the conducting polymer, in addition to dispersing effects on CNT due to the conducting polymer. In contrast, the conducting polymer used in the present invention has an acidic group, and this has a self-dopant in doped conditions. Therefore, it is possible to show conductivity without a treatment using the outside-dopant. Eikos does not disclose these points, nor would it have indicated or suggested them to a person of ordinary skill in the art.

5. Claims 3-4, 9-10 and 14 are unobvious over Chen et al. and Mitsubishi '930.

Dependent claims 3-4, 9-10 and 14 would not have been obvious to a person of ordinary skill in the art even if, *arguendo*, the Chen et al and the Mitsubishi '930 (JP 2002-140930) references were combined. Since amended claim 1 includes language drawn from former claim 8, and is therefore novel over the Chen reference, its dependent claims 3-4, 9-10 and 14 should likewise be novel and unobvious over the Chen reference. Moreover, the Office Action acknowledges that Chen et al. "do not explicitly disclose the presence of a high molecular weight compound, a basic compound and a conducting polymer of formula (5)," which additionally supports unobviousness as well. Furthermore, the secondary reference known as Mitsubishi '930 does not disclose that the conducting polymer containing an acidic group can be used in the CNT field, or the dispersing effects on CNT due to the conducting polymer.

6. Claims 4, 9-10 and 14 are unobvious over Chen et al. and Mitsubishi '739.

Dependent claims 4, 9-10 and 14 would not have been obvious to a person of ordinary skill in the art even if, *arguendo*, the Chen et al and the Mitsubishi '739 (JP 2000-219739) references were combined. Since amended claim 1 includes language drawn from former claim

8, and therefore claim 1 is novel over the Chen reference, its dependent claims 3-4, 9-10 and 14 should likewise be novel and unobvious over the Chen reference. Moreover, the Office Action acknowledges that Chen et al. “do not explicitly disclose the presence of a high molecular weight compound, a basic compound and a conducting polymer of formula (5),” which additionally supports unobviousness of these claims. Mitsubishi ‘739 discloses the method for producing high conductive aniline polymers in which a compound selected from the group consisting of alkali metal salts, alkali earth metal salts, ammonium salts, and substituted ammonium salts is acidic polymerized in a solution containing a basic compound and a solvent. While there might be only for the sake of argument some relevant facet in Examples ([0068] and [0069]), Mitsubishi ‘739 does not disclose that the conducting polymer containing an acidic group can be used in the CNT field, or the dispersing effects on CNT due to the conducting polymer.

**7. Claims 4, 9-10 and 14 define unobvious inventions
Over Blanchet-Fincher et al. and Mitsubishi ‘930.**

Dependent claims 4, 9-10 and 14 would not have been obvious to a person of ordinary skill in the art even if, *arguendo*, the Blanchet-Fincher et al and the Mitsubishi ‘930 references were combined. Since amended claim 1 includes language drawn from former claim 8, and therefore is novel over the Blanchet-Fincher et al. reference, its dependent claims 3-4, 9-10 and 14 should likewise be novel and unobvious over the Blanchet-Fincher reference. Blanchet-Fincher “do not explicitly disclose the presence of a high molecular weight compound, a basic compound and a conducting polymer of formula (5),” which additionally supports unobviousness of these claims. Furthermore, the secondary reference known as Mitsubishi ‘930 does not disclose that the conducting polymer containing an acidic group can be used in the CNT field, or the dispersing effects on CNT due to the conducting polymer.

8. Claims 4, 9-10 and 14 define unobvious inventions over Blanchet-Fincher et al. and Mitsubishi '739.

Dependent claims 4, 9-10 and 14 would not have been obvious to a person of ordinary skill in the art even if, *arguendo*, the Blanchet-Fincher et al and the Mitsubishi '930 references were combined. Since amended claim 1 includes language drawn from former claim 8, and therefore is novel over the Blanchet-Fincher et al. reference, its dependent claims 3-4, 9-10 and 14 should likewise be novel and unobvious over the Blanchet-Fincher reference. Moreover, the Office Action acknowledges that Blanchet-Fincher "do not explicitly disclose the presence of a high molecular weight compound, a basic compound and a conducting polymer of formula (5)."

The Mitsubishi '739 reference discloses the method for producing high conductive aniline polymers in which a compound selected from the group consisting of alkali metal salts, alkali earth metal salts, ammonium salts, and substituted ammonium salts is acidic polymerized in a solution containing a basic compound and a solvent. While there might be only for the sake of argument – '*arguendo*' – some relevant facet in Examples ([0068] and [0069]), Mitsubishi '739 does not disclose that the conducting polymer containing an acidic group can be used in the CNT field, or the dispersing effects on CNT due to the conducting polymer.

9. Claims 3-4, 8-10 and 14 define unobvious inventions over Glatkowski et al. or Eikos et al., plus Mitsubishi '930.

Applicants respectfully submit dependent claims 3-4, 8-10 and 14 define unobvious inventions for the reasons set forth hereinabove. The primary references taken seriatim do not disclose the subject matter of the independent claim 1 for the reasons discussed hereinabove, and even if, *arguendo*, they were combined with the secondary Mitsubishi '930, the subject matter

defined by dependent claims 3-4, 8-10 and 14 would not have been obvious to a person of ordinary skill in the art.

10. Claims 4, 8-10 and 14 define unobvious inventions over Glatkowski et al. or Eikos et al., plus Mitsubishi '739.

Applicants respectfully submit dependent claims 4, 8-10 and 14 define unobvious inventions for the reasons set forth hereinabove. The primary references taken seriatim admittedly do not disclose the subject matter of the independent claim 1 as discussed hereinabove, and even if, *arguendo*, they were combined with Mitsubishi '739, the subject matter of these dependent claims would not have been obvious to a person of only ordinary skill in the art.

11. Claim 6 is unobvious over Glatkowski et al., Eikos et al., Blanchet-Fincher et al. or Chen et al., in view of Eikos et al. and Search Report.

Applicants respectfully submit dependent claim 6 defines an unobvious invention for the reasons set forth hereinabove. The primary references taken seriatim admittedly do not disclose the subject matter of the independent claim 1 as discussed hereinabove. This rejection should be withdrawn in its entirety. It is circular. Re-combining the primary references with one of their own (Eikos) and a Search Report (which is not prior art) is compelling evidence militating in favor of reconsideration and withdrawal of this rejection.

12. Claim 7 is unobvious over Glatkowski et al., Eikos et al., Blanchet-Fincher et al. or Chen et al., in view of Hsu.

Applicants respectfully submit dependent claim 7 defines an unobvious invention for the reasons set forth hereinabove. The primary references taken seriatim admittedly do not disclose the subject matter of the independent claim 1, and even if, *arguendo*, they were combined with

the Hsu reference, the subject matter defined by Applicants' claim 7 would not have been obvious to a person of only ordinary skill in the art.

Conclusion

If the Examiner has any questions, or has any suggestions for bringing this application to an allowance, kindly telephone the undersigned.

Applicants respectfully solicit favorable reconsideration followed by a Notice of Allowance.

Respectfully submitted,

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